

WHAT IS CLAIMED IS:

1. A hydraulic disc brake device used in a brake system of a vehicle, comprising:

a base assembly mounted on the vehicle;

5 a sliding assembly slideably mounted on the base assembly and moveable along a predetermined arc;

a return spring disposed between the base assembly and the sliding assembly, a relative motion between the base assembly and the sliding assembly can cause a compression of the return spring;

10 a brake lining assembly employed to clamp a brake disc and controlled by oil pressure of an oil pressure system of the vehicle;

a control valve assembly disposed on the oil pressure system for controlling the oil pressure of the oil pressure system, wherein an inertial force acted on the brake lining assembly in the case of a brake action will cause the sliding assembly to  
15 move along the predetermined arc with respect to the base assembly, the relative movement between the sliding assembly and the base assembly will cause compression of the return spring and make the control valve assembly stop increasing the oil pressure, then the control valve assembly produces a press relief oil space in the base assembly, after the brake lining assembly releases the brake disc,  
20 the return spring will close the pressure relief oil space again, thus increasing the oil pressure again, allowing the brake lining assembly to clamp and release the brake disc repeatedly.

2. The hydraulic disc brake device as claimed in claim 1, wherein the base

assembly is installed on a wheel carrier of the vehicle and includes a first arc-shaped track and a second arc-shaped track, the control assembly is disposed in the base assembly, and the sliding assembly is slideably disposed on the first and second arc-shaped tracks of the base assembly.

5           3. The hydraulic disc brake device as claimed in claim 2, wherein:

the first arc-shaped is located correspondingly to a center of the brake disc, the second arc-shaped track is located correspondingly to the center of the brake disc and is formed with a hole along its length;

10           the sliding assembly includes a seat, the brake lining assembly and a sliding device, a brake space is defined in the seat for accommodation of the brake disc and the brake lining assembly, the sliding device is installed on the seat, and the first and second arc-shaped track are to be slideably mounted on the sliding device.

15           4. The hydraulic disc brake device as claimed in claim 2, wherein the base assembly is fixed on the wheel carrier by a positioning board which is mounted on the wheel carrier by screws, and a plurality of positioning bolts is screwed on opposite sides of the positioning board, a positioning arm protrudes from a side of the pressing device and is to be positioned on one of the positioning bolts by a positioning sleeve, one end of the first arc-shaped track is positioned on the other one of the positioning bolts by a positioning sleeve.

20           5. The hydraulic disc brake device as claimed in claim 2, wherein the first and second arc-shaped tracks are located correspondingly to the center of the brake disc.

6. The hydraulic disc brake device as claimed in claim 3, wherein the base

assembly is formed with a flange and includes a pressing device, the pressing device includes a piston moveably sealed in an oil chamber, the oil pressure of the oil chamber serves to push the piston, a safety oil passage is formed in a bottom of the hole of the second arc-shaped track and is in communication with the oil chamber of  
5 the pressing device;

an elliptical sliding hole is formed in the center of the seat of the sliding assembly for passage of the piston of the pressing device and the flange of the base assembly, a brake-mounting portion protrudes from the elliptical sliding hole of the seat, the brake space is defined between the brake-mounting portion and the  
10 elliptical sliding hole; and

the brake lining assembly includes a front brake lining shoe and a rear brake lining shoe that are installed on the seat in a parallel manner, a front surface of the front brake lining shoe is pressed against the piston of the pressing device.

7. The hydraulic disc brake device as claimed in claim 3, wherein:

15 a safety oil passage is formed in a bottom of the hole of the second arc-shaped track and is in communication with the oil chamber of the pressing device;

a stop portion is formed on the seat of the sliding assembly and is located correspondingly to the second arc-shaped track of the base assembly;

20 the return spring is biased between a bottom of the hole of the second arc-shaped track of the base assembly and the stopping portion of the sliding assembly.

8. The hydraulic disc brake device as claimed in claim 3, wherein the

sliding device includes inverted U-shaped seats, dust-proof frames and wear-resistance pieces assembled together by screws, the inverted U-shaped seats are fixed on the seat by rivets, the inverted U-shaped seats are slideably mounted on the first and second arc-shaped tracks.

5           9. The hydraulic disc brake device as claimed in claim 6, wherein a stepped recess is formed at a side of the elliptical sliding hole, and an anti-collision block is fixed in the stepped recess by screws for preventing the flange of the base assembly from impact.

10           10. The hydraulic disc brake device as claimed in claim 6, wherein two brake-lining positioning shafts are fixed in a brake space of the seat of the sliding assembly and are located at both sides of the elliptical sliding hole, a front brake lining shoe and a rear brake lining shoe of the brake lining assembly are inserted on the two brake-lining positioning shafts.

15           11. The hydraulic disc brake device as claimed in claim 6, wherein the brake-mounting portion is provided with an engaging rib located in the brake space, a pressing spring leaf is disposed against a side of the front brake lining shoe and the rear brake lining shoe and is positioned on the engaging rib of the brake-mounting portion of the seat, thus preventing the front brake lining shoe and the rear brake lining shoe from becoming loose.

20           12. The hydraulic disc brake device as claimed in claim 6, wherein the pressing device includes the oil chamber, the piston, oil seals, a steel-ball positioning disc and a plurality of steel balls, the piston is moveably sealed in the oil chamber by the oil seals, the steel-ball positioning disc is positioned at an end of the piston, the

plurality of steel balls is positioned between the steel-ball positioning disc and the piston, a plurality of through holes is defined in the steel-ball positioning disc, and the respective steel balls partially protrude from the through holes;

the front surface of the front brake lining shoe is pressed against the steel balls on the steel ball positioning disc of the piston of the pressing device, and can move smoothly under the aid of the steel balls protruding from the steel ball positioning disc.

13. The hydraulic disc brake device as claimed in claim 7, wherein the seat includes a second positioning portion located correspondingly to the second arc-shaped track of the base assembly, the stop portion is formed at the end of the second positioning portion, an anti-collision piece is fixed on the stop portion by screws, and a screw is disposed at the center of the stop portion and the anti-collision piece.

14. The hydraulic disc brake device as claimed in claim 7, wherein:  
the control valve assembly includes a control groove, a control rod, a relief valve, a main passage, an auxiliary passage and a pressure relief space, the control groove is located adjacent to the oil chamber of the pressing device, a guide cover with a central hole is disposed at either side of the control groove, both ends of the control rod are protruded out of the center hole of the guide cover, the control groove is connected to the oil chamber of the pressing assembly via the main passage and the pressure relief space;

the auxiliary passage is connected to the safety oil passage of the second arc-shaped track;

the relief valve includes a pressure relief steel ball, a pin and a spring disposed in the pressure relief space, respectively, the pin is to be pressed by the spring and the oil pressure of the oil chamber, the pressure relief steel ball is located in the control groove, and the pin is slideably sealed between the oil chamber and the  
5 control groove;

a first oil ring and a second oil ring are positioned in a mid section of the control groove, the first and second oil rings each is formed with an open guiding structure, the first oil ring is located correspondingly to the main passage, and the second oil ring is located correspondingly to the auxiliary passage, the control rod is  
10 inserted in the control groove, the control rod is formed with a control passage, a first oil hole and a second oil hole are formed in the control passage and are located correspondingly to the first oil ring and the second oil ring, respectively, an annular neck portion is formed on the control rod and is located correspondingly to the pressure relief space, and the pressure relief steel ball of the pressure relief valve is  
15 to be engaged in and disengaged from the annular neck portion, when the pressure relief steel ball moves into the annular neck portion, a pressure relief oil space will appear at another end of the pin opposite the pressure relief steel ball.

15. The hydraulic disc brake device as claimed in claim 8, wherein a plurality of cavities with steel balls are formed in the respective inverted U-shaped  
20 seats, and the steel balls are located between the inverted U-shaped seat and the first and second arc-shaped tracks, the respective dust-proof frames are fixed to the inverted U-shaped seats by screws, so as to enable the steel balls and the inverted U-shaped seats to slide smoothly and stably.

16. The hydraulic disc brake device as claimed in claim 13 further comprises a spring assembly confined in the hole of the second arc-shaped track by the stop portion of the sliding assembly, the spring assembly includes a return spring.

17. The hydraulic disc brake device as claimed in claim 14, wherein a guide  
5 cover having a central hole and a dust-proof ring is screwed to either side of the control groove, both ends of the control rod are protruded out of the center hole of the two guide covers.

18. The hydraulic disc brake device as claimed in claim 14, wherein a  
10 plurality of oil seals, the first oil ring and the second oil ring are positioned in the mid section of the control groove by a C ring.

19. The hydraulic disc brake device as claimed in claim 16, wherein the  
spring assembly includes a safety rod, a safety spring, a support bracket, and a return spring, the return spring cooperating with the support bracket is pressed against the  
bottom of the hole of the second arc-shaped track, and another end of the return  
15 spring is pressed against the stop portion of the sliding assembly, the safety spring is restricted in the support bracket, and the safety rod is disposed in the support bracket, the safety rod and the return spring push the safety rod to move, so as to close the safety oil passage of the second arc-shaped track.

20. A hydraulic disc brake device used in a brake system of a vehicle,  
20 comprising:

a seat being mounted on a wheel carriage of the vehicle, and having two sliding members disposed in a predetermined arc-shaped route,

a base assembly slideably mounted in the sliding members of the seat;

a return spring disposed between the base assembly and the sliding assembly, a relative motion between the base assembly and the sliding assembly can cause a compression of the return spring;

5 a brake lining assembly employed to clamp a brake disc and controlled by oil pressure of an oil pressure system of the vehicle;

a control valve assembly disposed on the oil pressure system for controlling the oil pressure of the oil pressure system, wherein an inertial force acted on the brake lining assembly in the case of a brake action will cause the sliding assembly to move along the predetermined arc with respect to the base assembly, the relative  
10 movement between the sliding assembly and the base assembly will compress the return spring and make the control valve assembly stop increasing the oil pressure, then the control valve assembly opens a pressure relief oil space in the base assembly, after the brake lining assembly releases the brake disc, the return spring will close the pressure relief oil space again, thus increasing the oil pressure again, allowing  
15 the brake lining assembly to clamp and release the brake disc repeatedly.

21. The hydraulic disc brake device as claimed in claim 20, wherein two sliding members are mounted on the wheel carriage of the vehicle.

22. The hydraulic disc brake device as claimed in claim 20, wherein the base assembly includes a pressing device, a first arc-shaped track and a second  
20 arc-shaped track, the pressing device is pushed by pressure of a main cylinder, the first arc-shaped track is slideably disposed in the seat and is provided with spring assembly and a safety oil passage, the second arc-shaped track is slideably disposed in the seat.



23. The hydraulic disc brake device as claimed in claim 20, wherein the return spring is biased between the base assembly and the sliding members of the seat.

24. The hydraulic disc brake device as claimed in claim 20, wherein the  
5 brake lining assembly includes a front brake lining shoe and a rear brake lining shoe that are installed in the seat, a front surface of the front and rear brake lining shoes are pressed against the piston of the pressing device.

25. The hydraulic disc brake device as claimed in claim 20, wherein the control valve assembly includes a control groove, a control rod, a relief valve, a  
10 main passage, an auxiliary passage and a pressure relief space, the control groove is located adjacent to the oil chamber of the pressing device, a guide cover with a central hole is disposed at either side of the control groove, both ends of the control rod are protruded out of the center hole of the guide cover, the control groove is connected to the oil chamber of the pressing assembly via the main passage and the  
15 pressure relief space;

the auxiliary passage is connected to the safety oil passage of the first arc-shaped track, an oil feeding hole located opposite the auxiliary passage;

a first oil ring and a second oil ring are positioned in a mid section of the control groove, the first and second oil rings each is formed with an open guiding  
20 structure, the first oil ring is located correspondingly to the main passage, and the second oil ring is located correspondingly to the auxiliary passage, the control rod is formed with a control passage, a first oil hole and a second oil hole are formed in the control passage and are located correspondingly to the first oil ring and the second

oil ring, respectively, an annular neck portion is formed on the control rod and is located correspondingly to the pressure relief space, and the pressure relief steel ball of the pressure relief valve is to be engaged in and disengaged from the annular neck portion, when the pressure relief steel ball moves into the annular neck portion, a  
5 pressure relief oil space will appear at another end of the pin opposite the pressure relief steel ball.

26. The hydraulic disc brake device as claimed in claim 22, wherein the first and second arc-shaped tracks of the base assembly are located correspondingly to the center of the brake disc.

10 27. The hydraulic disc brake device as claimed in claim 22, wherein the base assembly includes a pressing device, the pressing device includes a piston moveably sealed in an oil chamber, the oil pressure of the oil chamber serves to push the piston, a hole is formed in the first arc-shaped track, and a safety oil passage is formed in a bottom of the hole and is in communication with the oil chamber of the  
15 pressing device;

the sliding assembly is installed on the wheel carriage;

the brake lining assembly includes a front brake lining shoe and a rear brake lining shoe that are installed on the seat in a parallel manner, a front surface of the front brake lining shoe is pressed against the piston of the pressing device.

20 28. The hydraulic disc brake device as claimed in claim 22 comprising a spring assembly confined in the hole of the first arc-shaped track by the sliding member of the seat, the spring assembly includes a return spring.

29. The hydraulic disc brake device as claimed in claim 22, wherein the seat

is fixed on the wheel carriage by screws.

30. The hydraulic disc brake device as claimed in claim 26, wherein the first and second arc-shaped tracks of the base assembly are square in cross section and located correspondingly to the center of the brake disc.

5        31. The hydraulic disc brake device as claimed in claim 25, wherein a guide cover with a central hole is disposed at each side of the control valve assembly, both ends of the control rod are protruded out of the center hole of the guide cover.

10       32. The hydraulic disc brake device as claimed in claim 25, wherein the relief valve includes a pressure relief steel ball, a pin and a spring disposed in the pressure relief space, respectively, the pin is to be pressed by the spring and the oil pressure of the oil chamber, the pressure relief steel ball is located in the control groove, and the pin is slideably sealed between the oil chamber and the control groove.

15       33. The hydraulic disc brake device as claimed in claim 3 or 26, wherein the first arc-shaped track and the second arc-shaped track are covered with a wear-resistance cover.

20       34. The hydraulic disc brake device as claimed in claim 27, wherein a stop board is disposed at both sides of the seat, each of the two sliding members is an inverted U-shaped structure with one end closed, and when the seat moves relative to the base assembly, both ends of the control rod of the control valve assembly are controlled by the stop board of the seat.

35. The hydraulic disc brake device as claimed in claim 28, wherein the spring assembly includes a safety rod, a safety spring, a support bracket, and a return

spring, one end of the return spring cooperating with the support bracket is pressed against the bottom of the hole of the first arc-shaped track, and another end of the return spring is pressed against the sliding member of the sliding assembly, the safety spring is restricted in the support bracket, and the safety rod is disposed in the support bracket, the safety rod and the return spring push the safety rod to move, so as to close the safety oil passage of the second arc-shaped track.

36. The hydraulic disc brake device as claimed in claim 20, wherein the control valve assembly includes a main cylinder which uses oil pressure to control the brake lining assembly.

10 37. The hydraulic disc brake device as claimed in claim 36, wherein the main cylinder of the base assembly is controlled by a steel cord on the handlebar.

38. The hydraulic disc brake device as claimed in claim 36, wherein the main cylinder of the base assembly is controlled by the handlebar.

15 39. The hydraulic disc brake device as claimed in claim 36, wherein the main cylinder and an elastic oil-storage cylinder are installed on the base assembly, and the elastic oil-storage cylinder serves to supply oil.

20 40. The hydraulic disc brake device as claimed in claim 37, wherein the main cylinder utilizes a steel cord to drive the main piston, so as to push the oil into the oil chamber, a pushing spring, an O-shaped ring, and a piston are sealed in the elastic oil-storage cylinder by a cover, the pushing spring pushes the piston to move, so as to push the oil into the main cylinder, and the oil pressure of the main cylinder is directly connected to the control valve assembly.